REMARKS

The above-identified patent application has been amended and Applicants respectfully request the Examiner to reconsider and again examine the claims as amended in accordance with the provisions of 37 C.F.R §1.116.

Claims 5-8, 12, 13, 26-29 and 39-44 are pending in the application. All claims are rejected. Claims 12, 13, and 39-44 are amended herein. Claims 45-48 are hereby added. Claims 1, 2-4, 8-11, 14-18, 19-25, and 30-38 were previously cancelled.

Claim Objections

Claim 13 was objected to because of certain grammatical informalities, which have been corrected herein in the manner suggested by the Examiner. Therefore, the objection to claim 13 is now moot and should be withdrawn.

The Rejections under 35 U.S.C. §112, Second Paragraph

The Examiner rejects Claims 12 and 42-44 under 35 U.S.C. §112 second paragraph as being indefinite because these claims use "adapted to" language. Applicants have amended all of these claims to remove all "adapted to" language and to recite instead that the recited component performs or has the recited functionality/elements (e.g., "a processor receiving . . .wherein the processor determines . . . such that the processor directs . . . " as recited in claim 12, as amended). Therefore, Applicants believe that the rejection of claims 12 and 42-44 under 35 U.S.C. §112 second paragraph has been overcome.

In view of the above, Applicants submit that the rejection of Claims 12 and 42-44 under 35 U.S.C. §112, second paragraph, should be removed.

The Rejections under 35 U.S.C. §103(a)

The Examiner rejects Claims 5-8, 12-13, 26-39, and 39-44 under 35 U.S.C. §103(a) as being unpatentable over Azuma et al. ("Visualization Tools for Free Flight Air-Traffic Management") in view of Hancock (US 5,179,377) and Staggs et al. (US 6,433,729B1).

As the Examiner is aware, and as found in MPEP §2142, in order to establish a prima facie case of obviousness "...the prior art reference (or prior art references when combined) must teach or suggest all the claim limitations." The Examiner asserts that Azuma teaches each and every limitation of claim 12 except changing the shape of the icon in a manner indicative of the received altitude, and the Examiner relies on both Hancock and Staggs to provide teaching and/or suggestion for changing the shape of the icon in a manner indicative of the received altitude. Applicants respectfully disagree that this combination of references teaches or suggests each and every element of claims 5-8, 12-13, 26-39, and 39-44, as amended herein.

Rejection of Claim 12

Applicants submit that claim 12, as amended, is patentably distinct over Azuma, Hancock, and Staggs, because none of these references, taken alone or in combination, provides:

> *A system for conveying aircraft altitude to a human observer, the system comprising:*
>
> *a processor receiving latitude, longitude, and altitude information relating to an aircraft, the altitude information corresponding to an altitude of the aircraft relative to a geographic reference, wherein the processor determines, based on the altitude information, a shape for an icon representing the aircraft, wherein the shape is indicative of the altitude of the aircraft relative to the geographic reference; and*
>
> *a display in operable communication with the processor, the display providing a two-dimensional planar view and having a first axis representing latitude and a second axis representing longitude, wherein the processor directs the display to present the icon at a position on the display indicative of the latitude and longitude of the aircraft, wherein the shape of the displayed icon is indicative of the altitude of the aircraft relative to the geographic reference, and wherein the processor directs the display to change the shape of the icon in response to a change in the altitude information.*

First, the Examiner asserts that Hancock's description of overlaying different threat symbols onto aircraft symbols based on their altitude and/or distance to current position "*can be read to suggest changing the shape of the icon based on the altitude information*". Applicants fail to see how this Hancock can be viewed as suggesting this, because overlaying a second symbol onto a first symbol does not necessarily change the shape of the first symbol. Indeed, in the examples and illustrations provided in Hancock, no aircraft symbols/icons are ever shown or described as being changed in shape when symbols are superimposed thereon. Rather, in Hancock, the symbols being overlaid are known TCAS threat symbols, such as diamonds and squares, and they are clearly described and illustrated as being approximately proportional to the size of the aircraft being displayed such that they "fit in" to the contours of the displayed aircraft icon shape (e.g., triangles on wing tips, diamonds on the body of the aircraft, etc.).

In addition, Hancock's overlaying of symbols (to indicate altitude) actually is intended to indicate relative altitude between aircraft (i.e., the altitude of a second aircraft relative to the altitude of a first aircraft) (see, e.g., col. 3, line 62 through col. 4, line 7 of Hancock), not the altitude of an aircraft relative to a geographic reference, as required by claim 12, as amended. Hancock never teaches or suggests that any of the overlaid symbols change the shape of the aircraft icon in response to any changes in any information, including altitude information relative to a geographic reference, as required by claim 12, as amended.

The Examiner acknowledges that Hancock fails to expressly teach changing the shape of the aircraft itself on the display, and instead relies on Staggs as teaching that "*changing the actual shape of the icon is the most effective manner to indicate warning position.*" However, "changing the actual shape of the icon to indicate warning position" is not what claim 12, as amended (and even before amendment), actually requires and is quite different than the recitation of claim 12, as amended. Claim 12, as amended, requires that "***the processor determines, based on the altitude information, a shape for the icon representing the aircraft, wherein the shape is indicative of the altitude of the aircraft relative to the geographic reference; and . . . wherein the processor directs the display to present the icon at a position on the display indicative of***

the latitude and longitude of the aircraft, wherein the shape of the displayed icon is indicative of the altitude of the aircraft relative to the geographic reference, and wherein the processor directs the display to change the shape of the icon in response to a change in the altitude information based on the altitude information" None of the art of record, including Staggs, does any of this, whether taken alone or in combination.

Staggs merely describes highlighting to a first aircraft a potential conflict with another aircraft in a given vertical sampling volume by changing the shape of the symbol representing a three-dimensional position of the other aircraft within the vertical sampling volume (Staggs at col. 9, lines 31-67). Specifically, Staggs refers to changing the shape of the symbol representing the position of the other aircraft **only if there is a potential conflict or threat to the host aircraft**. In sharp contrast, in the invention as recited in claim 12, as amended, the shape of the icon is indicative of the **altitude** of an aircraft (not the so-called "conflict" or "threat" of an aircraft), and the shape of an icon with claim 12, as amended, can change if the altitude of the aircraft changes, regardless of whether the change in altitude represents the aircraft becoming more of (or less of) a "threat". Moreover, claim 12, as amended, does not contain any language that limits changes in shape of the icon only to so-called "threatening" aircraft, as does the teachings of Staggs.

Staggs does not teach, suggest, or illustrate that the potential conflict or threat that would cause a shape change *necessarily* involves altitude. As those of skill in the art will recognize, determining that another aircraft is or poses a "threat" or "conflict", as is done in Staggs, does not necessarily mean the threat or conflict relates to the *altitude* of the aircraft. The existence of a threat or conflict could, for example, be related to another factor, such as speed, as even Staggs recognizes (see Staggs at col. 18, lines 8-21). Moreover, as those of skill in the art will appreciate, determining that an aircraft has become a "threat" is not necessarily the same thing as determining that the altitude of the aircraft has changed. Changes in altitude of an aircraft do not imply necessarily that the aircraft is or would become a threat because of such a change – conceivably a change in altitude could mean that an aircraft becomes *less* of a "threat". Thus,

Applicants do not view Staggs description of changing the shape of an icon representing an aircraft in response to a determination that said aircraft has become a threat as teaching or suggesting the requirement of claim 12, that "the processor directs the display to change the shape of the icon in response to a change in the altitude information."

Further, Staggs does not teach, suggest, or illustrate determining a shape for an icon based on altitude, as required by claim 12, as amended, nor does Staggs teach, suggest, or illustrate displaying the icon with a shape that is indicative of the altitude of an aircraft relative to a geographic reference, as required by claim 12, as amended. With the invention as recited in claim 12, as amended, the aircraft is given a shape based on its altitude, whether or not the aircraft represents a so-called "threat" or "conflict," and this shape changes based on changes in altitude. This is quite different than Staggs, which never teaches or suggests that altitude has any impact on any particular shape or change in shape being given to an aircraft. In Staggs, one cannot view the non-threatening aircraft in Staggs and determine, by the shape alone, what altitude the aircraft is at, whereas this would be possible in the invention as recited in claim 12, as amended, because claim 12, as amended, provides that the icon's shape is indicative of altitude. In contrast, all that Staggs is concerned with is whether a given aircraft is a "threat" relative to the host aircraft and how this can be displayed to the user via a vertical profile display.

Applicants further note that the orientation and arrangement of the display of Staggs is very different than that used for the display required by claim 12, as amended (and is also different than the standard planar display, conveying latitude and longitude information that used for the displays of Azuma and Hancock). Claim 12, as amended, requires a display that provides "*a two-dimensional planar view and having a first axis representing latitude and a second axis representing longitude, wherein the processor directs the display to present the icon at a position on the display indicative of the latitude and longitude of the aircraft, wherein the shape of the displayed icon is indicative of the altitude of the aircraft relative to the geographic reference.*" In sharp contrast, Staggs provides a different type of two dimensional view – a so-called "vertical profile view" that presents, in two dimensions, an illustration of the *relative vertical*

orientation of "intruders" relative to a host aircraft, where "relative lateral intruder positions are no longer clearly evident in the vertical profile display". (Staggs at FIGs. 9A-12B, col. 9, lines 31-67, col. 15, lines 8-29). Thus, Staggs does not provide lateral position information (e.g., latitude) on its display that shows a change in shape of an icon when a threat is perceived; furthermore, the vertical information provided in Staggs is described as being is relative to a host aircraft, not a geographic reference, as recited in claim 12, as amended.

Furthermore, as the Examiner is aware, and as found in MPEP §2142, in order to establish a prima facie case of obviousness "...there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." Applicants respectfully submit that the Examiner has not met this burden in order to establish prima facie obviousness.

The Examiner has implied this motivation to modify Azuma with Hancock and Staggs exists because (a) Hancock teaches redundant coding is a good idea so that "altitude can be determined at a glance in a 2D plan view," and (b) because Staggs supposedly "clearly provides that changing the shape improves visual redundancy" and is better for obtaining user attention "than purely tagging the differentially sized icon with the traditional air traffic control symbol." Applicants respectfully disagree and contend that the combination of references actually teaches away from (a) and (b) above.

First, as to the assertions in (a) regarding Hancock, if Hancock shows a 2D display where altitude can be determined at a glance, Applicants fail to see how one of skill in the art would then modify Hancock with a reference such as Staggs, because Staggs completely removes one type of information (latitude or horizontal orientation information) from this 2D display (thereby changing the operation of the reference) and provides *vertical orientation* "at a glance" only within a particular sampling volume. This is not the same thing as providing *vertical altitude* at a glance of all aircraft able to be tracked by the system, as is done in Hancock. Staggs deals only

with a subset of aircraft within a particular vertical sampling volume. Further, Staggs notes that further mental processing by a pilot (i.e., not "at a glance") would be necessary for the pilot to even estimate, within useful limits, the actual vertical distance (i.e., relative altitude) a given aircraft is (see., e.g., col. 13, lines 29-29 of Staggs). Thus, Applicants do not agree that one of skill in the art would find motivation in Azuma or Hancock to modify the 2D display with the teachings of Staggs, nor do Applicants see any motivation in Staggs to apply it to the 2D displays of either Azuma or Hancock – Staggs is simply dealing with a very different type of display, as has been discussed extensively above.

As to the assertions listed in (b) above, Applicants maintain that Staggs never teaches or suggests that changing shape is better for obtaining user attention than tagging the differentially sized icon with a traditional air traffic control symbol. Staggs never even mentions tagging an icon or performing any action on an icon to indicate a change in altitude; rather, Staggs merely presents changing an icon's shape (or changing color, flashing the icon, enclosing it within a box, etc.) as one of several possible ways to alert a flight crew to a conflict (NOT a change in altitude). Moreover, Staggs teaches that use of the *traditional air traffic control symbols* (existing horizontal traffic symbology used with conventional TCAS displays) is advantageous and preferred: he uses the so-called traditional air traffic control symbols for his icons and, when Staggs changes the shapes of his icons, they are likewise changed to other traditional air traffic control symbols (see., e.g., FIGs. 11A, 11B, and the accompanying description at co. 17, lines 41-67). Staggs expressly teaches that "*The present invention preferably draws on existing horizontal traffic symbology and display processes to maximize commonality with conventional TCAS displays . . . Flight crew retraining to learn to interpret data in a new fashion is thereby avoided*" (Staggs at col. 15, lines 45-53). Thus, Applicants maintain that there is no teaching, motivation, or suggestion in any of the references to change the shape of an icon to indicate altitude.

For at least the above reasons discussed in connection with claim 12, Applicants maintain that claim 12 (and all claims dependent therefrom; namely claims 5-8 and 42-46) are patentably distinguishable over the art or record, taken alone or in combination.

Rejection of Claim 13

Applicants submit that claim 12, as amended, is patentably distinct over Azuma, Hancock, and Staggs, because none of these references, taken alone or in combination, provides the invention as recited in claim 13, as amended:

> *A method of conveying location of an object, the method comprising:*
> *receiving location information regarding the object, the location information including a first coordinate x, a second coordinate y, and a third coordinate z, wherein the third coordinate z represents an altitude of the object relative to a geographic reference;*
> *correlating the first and second coordinates (x,y) with a location of an icon on a display, the display providing a two-dimensional planar view and having a first axis representing the x coordinate and a second axis representing the y coordinate,;*
> *correlating the third coordinate z with a shape of the icon, wherein the icon shape is indicative of the value of the third coordinate z; and*
> *displaying the icon on the display, wherein the shape of the displayed icon changes in response to changes in the value of the third coordinate z, and wherein the displayed icon has a position on the display indicative of the first and second coordinates (x,y).*

The limitations recited in the method of claim 13, as amended, are similar to those of the system of claim 12, as amended, and were rejected on the same grounds. Accordingly, Applicants hereby repeat their arguments made above in connection with responding to and arguing over the rejection of claim 12. Claim 13, as amended, requires displaying an icon on a display, where the display provides *a two-dimensional planar view and has a first axis representing the x coordinate and a second axis representing the y coordinate, where the icon has a position on the display indicative of the first coordinate x and the second coordinate y, where the icon has a shape indicative of a third coordinate z (altitude) and where the shape of*

the displayed icon changes in response to changes in the value of the third coordinate z. As Applicants have clearly explained above in connection with claim 12, the combination of references fails to teach or suggest all of these limitations, and the references themselves fail to provide and teaching or suggestion to make the combination that the Examiner suggests.

Thus, for at least the above reasons (which are essentially the same as those discussed in connection with claim 12), Applicants maintain that claim 13 (and all claims dependent therefrom; namely claims 26-29, 39-41, 47, and 48) is likewise patentably distinguishable over the art or record, taken alone or in combination.

In view of the above, Applicants submit that the rejection of Claims 5-8, 12-13, 26-39, and 39-44 under 35 U.S.C. §103(a) should be removed.

New Claims

Newly added claims 45-48 depend from and include the limitations of claim 12 (claims 45 and 46) and claim 13 (claims 45 and 46). Support for the new claims can be found at FIG. 3 and at page 5, lines 20-30 of Applicants' Specification. No new matter has been added. Accordingly, Applicants maintain that new claims 45-48 are allowable over the cites references of record in this case for at least the same reasons given above in connection with claim 12 and 13. Consideration of new claims 45-48 is respectfully requested.

This amendment is being submitted along with a Request for Continued Application (RCE). It is submitted that this amendment places the application in condition for allowance or in better form for reconsideration and further search under the RCE, and thus, entry of this amendment is respectfully requested under the provisions of 37 C.F.R. §1.116.

In view of the above Amendment and Remarks, Applicants submit that the claims and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

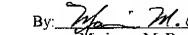
The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Amendment and Response or this application.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845, including but not limited to, any charges for extensions of time under 37 C.F.R. §1.136.

Respectfully submitted,

Dated: 15 Feb 2007

DALY, CROWLEY, MOFFORD & DURKEE, LLP

By: 

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